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Title: Registration of Laser Confocal Microscope (LCM), Wide Area Measurement System (WAMS), and X-Ray Tomographic (XRAY) Images

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Registration of Laser Confocal Microscope (LCM), Wide Area Measurement System (WAMS), and X-Ray Tomographic (XRAY) Images

James G. Wendelberger
CCS-6

12:32 MDT 16 September 2021

LA-UR-



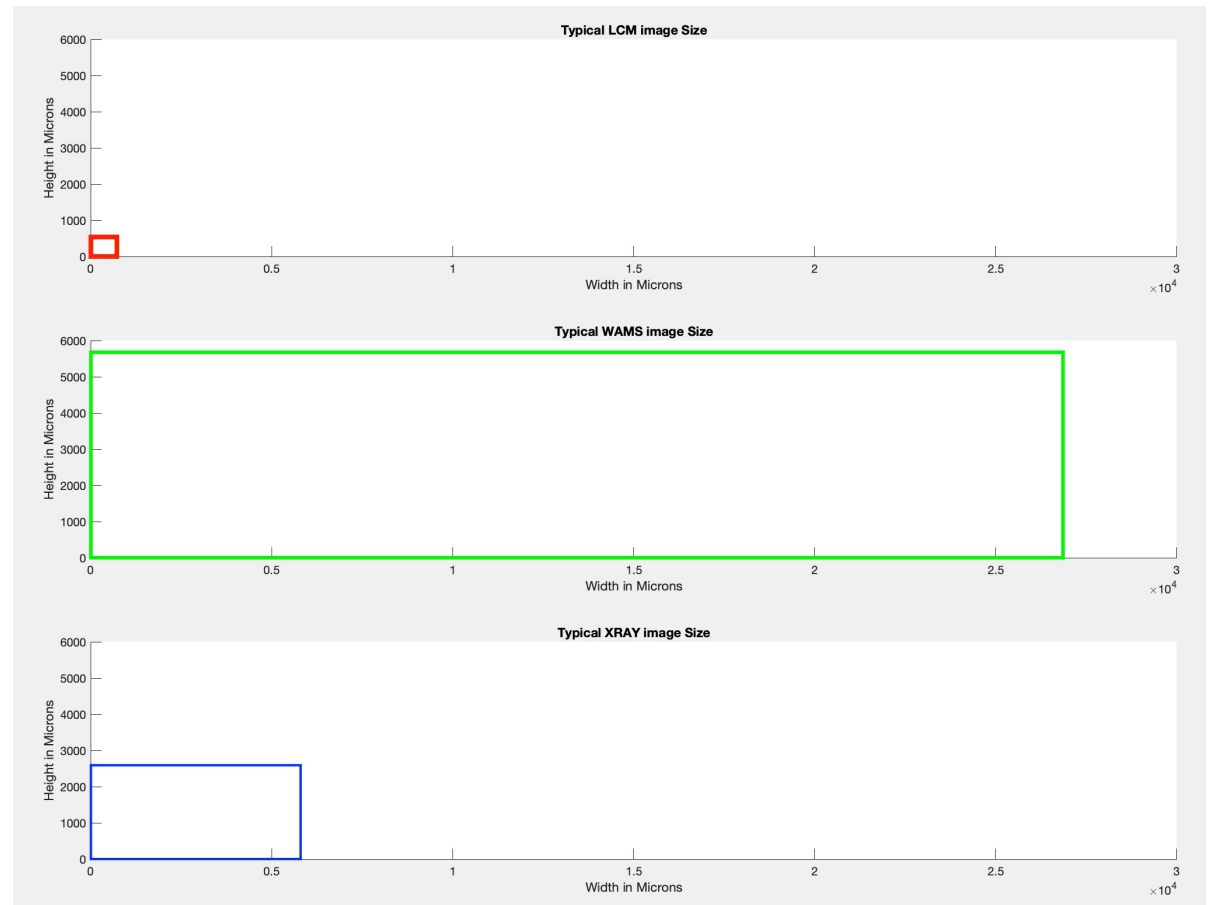
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Typical Sizes of LCM, WAMS and XRAY (2-d cut or 2-d cross section)

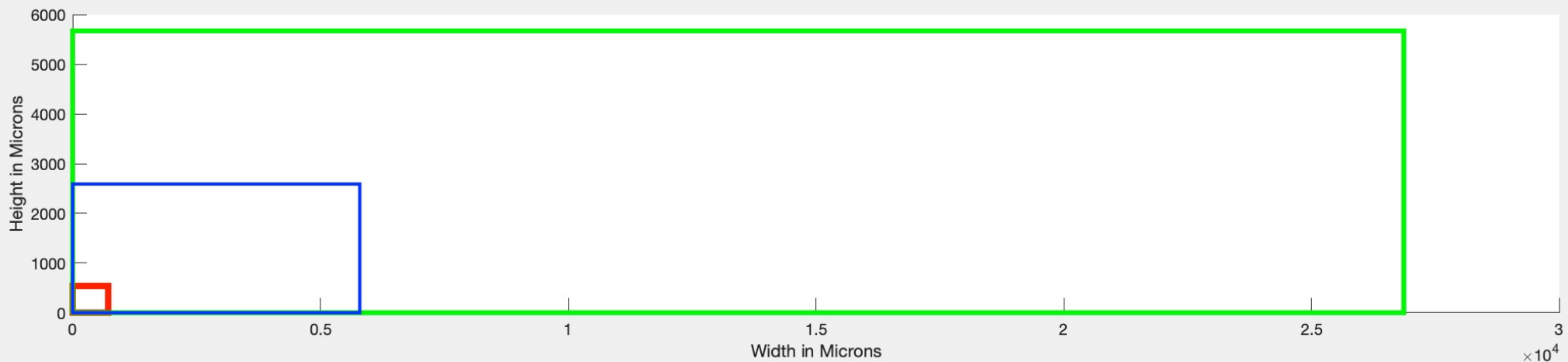
Typical LCM Resolution image pixels
LCMrows=768;
LCMcols=1024;
LCMsidelength=.7;

Typical WAMS Resolution image pixels
WAMSrows=1538;
WAMScols=7280;
WAMScsidelength=3.69;

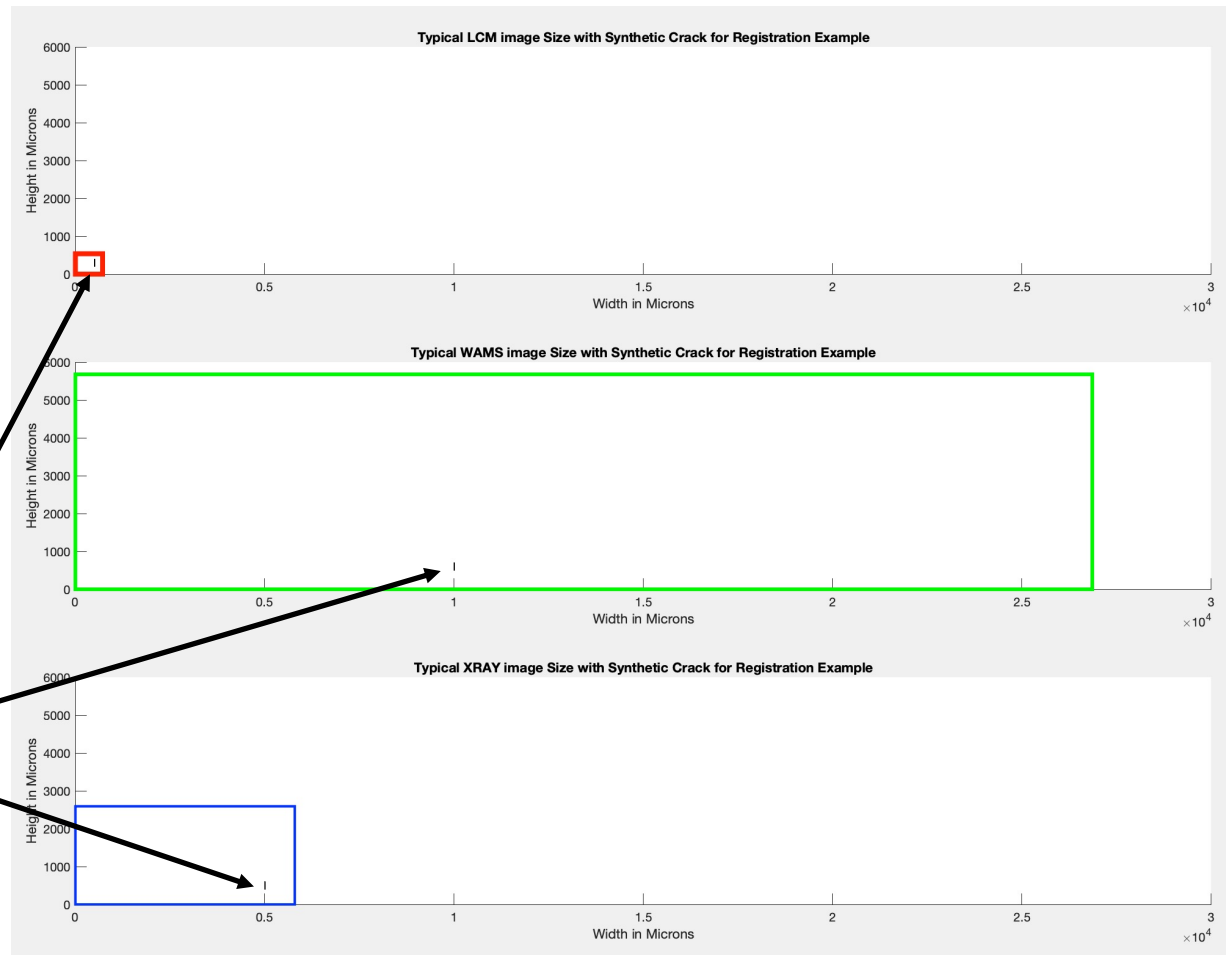
Typical XRAY Resolution image pixels
XRAYrows=896;
XRAYcols=2004;
XRAYsidelength=2.89176;



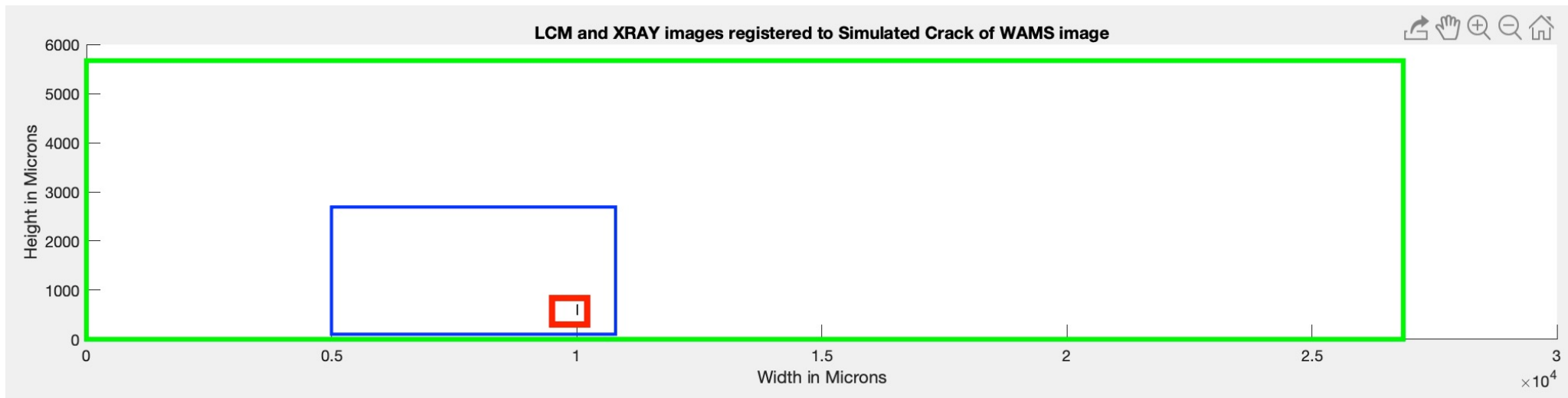
Typical LCM, WAMS and XRAY (2d-cut) Images Overlayed at Lower Corners



**Simulated
Vertical 200
micron by
20 micron
Crack in
Each Image**



LCM and XRAY Images Registered to Simulated Crack of WAMS Image



Other Registration Issues

- Images may be at various different angles to the horizontal axis
- Images may not be linear across the horizontal range
 - Due to curvature of the sample
 - Due to measurement device
- Image features may appear differently to the different measurement devices
- In the Tomographic X-Ray case the image is in fact a 3-d image and the registration must be made to a 2 dimensional cut of the 3-d object density
 - It was assumed here that the cut was perpendicular to the axis and at a zero degree angle to the axis